

Bizarre Microbes Represent a Major New Branch on Evolutionary Family Tree

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George Dvorsky

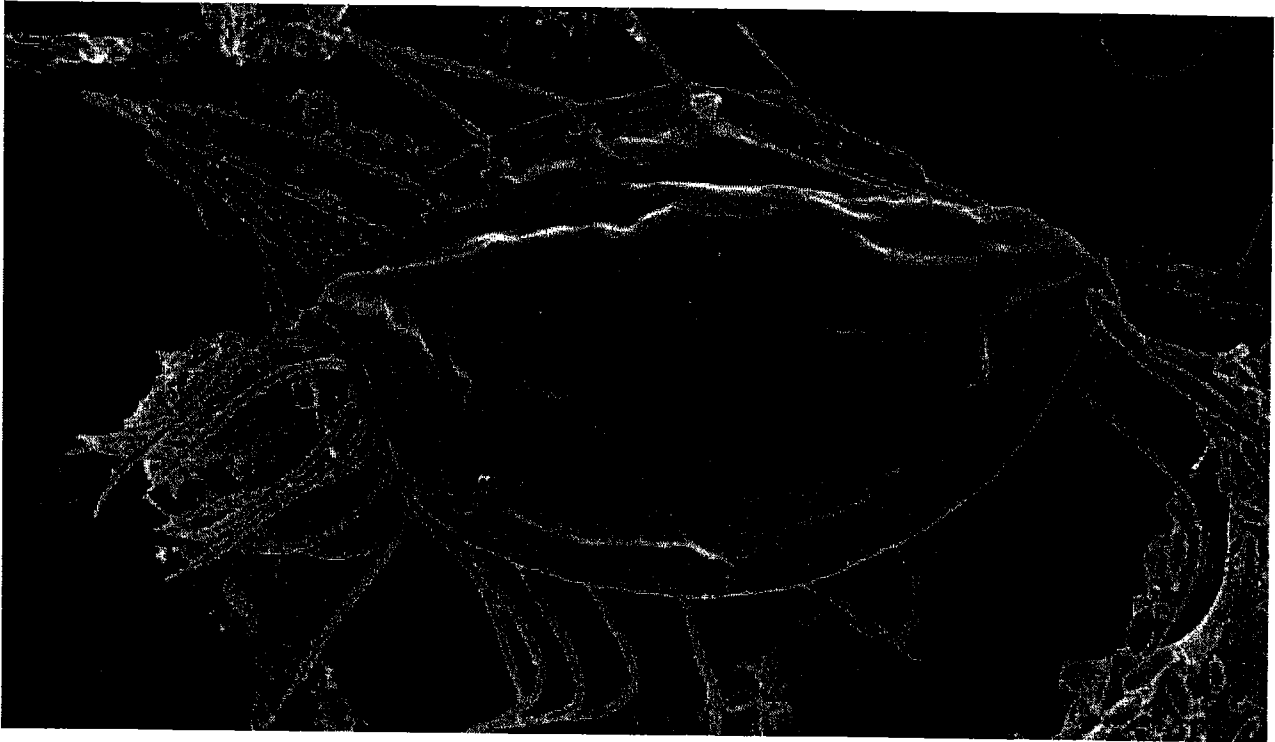
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Filed to: Wee beasties

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to one of the
Kingdoms, which way
it be and why?
It's their
reasoning that matters.



Microscopic image of *Hemimastix kukwesjijk*, a new species of hemimastigotes.

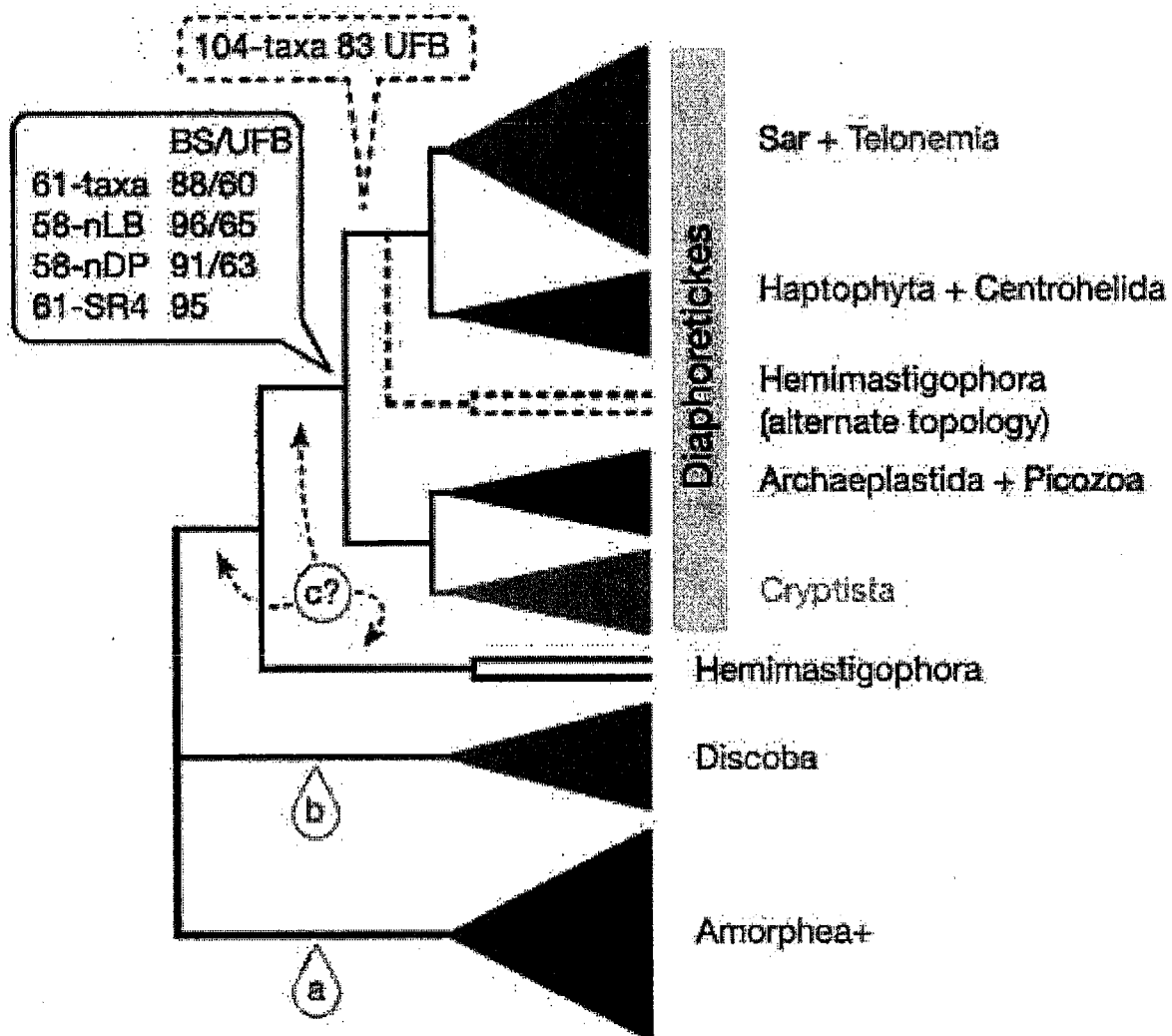
Image: Yana Eglit/Dalhousie University

Canadian scientists have identified microscopic creatures that are so unlike anything seen before, they had to create an entirely new branch on the evolutionary tree of life to slot them in.

A new paper published this week in *Nature* offers the first genetic analysis of hemimastigotes—a rare and poorly understood group of single-celled microorganisms. Biologists have known about these wee beasties for well over a century, but only now can hemimastigotes be officially slotted into the evolutionary tree of life, a process more formally known as phylogeny. And by doing so, scientists have stumbled upon a completely new branch on the tree of life—one dating back billions of years.

Virtually all eukaryotes belong to either the animal, plant, or fungi kingdoms, but some eukaryotes cannot be classified as such, and are deemed protists. Not satisfied with these broad designations, scientists created six "super-groups" for the eukaryote domain: Sar/Telonemia, Haptophyta/Centrohelida, Archaeplastida/Picozoa (this group contains plants), Cryptista (this group contains algae), Discoba, and Amorphea (this group contains animals and fungi).

To group these kingdom-level eukaryotes even further, scientists created one "supra-group," called Diaphoretickes, that lumped four similar super-groups together (see diagram below). The purpose of this organizational scheme is to sort and cluster species according to their relation to common ancestors, rather than by their physical characteristics or other attributes.



The six previously established eukaryote super-groups and Diaphoretickes supra-group, plus the new hemimastigotes supra-group proposed in the new study. Animals and fungi are in the Amorphea super-group, while plants fall under Archaeplastida + Picozoa.

Previously, scientists had designated Hemimastigophora at the level of phylum (below kingdom), but the new study suggests they belong to a distinct supra-group, or a "novel supra-kingdom-level lineage of eukaryotes," in the words of the researchers.

"While this position is interesting and helpful for reconstructing the evolution... of these organisms, the exclusion of the hemimastigotes is arbitrary," Hejnal told Gizmodo. "They [hemimastigotes] could also be included [in the Diaphoretickes group]—this lies in the eye of the beholder. This shows again, how arbitrary assignments such as 'supra-kingdom' are."

To which he added: "The 'novel supra-kingdom' sounds fancy and exciting—but is of no scientific value. Pity that it obscures the main accomplishment of the authors that they are able to place this group in the tree of life—which is truly a scientific advance."

Moving forward, it'll be interesting to see if other scientists agree with this classification. As noted, there are other species of hemimastigotes; perhaps further phylogenetic research will affirm the creation of this new supra-group, or it could inflame this debate even further. If anything, this discovery shows the need for improved ways of describing and classifying organisms along the highest branches on the tree of life.

[Nature]

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